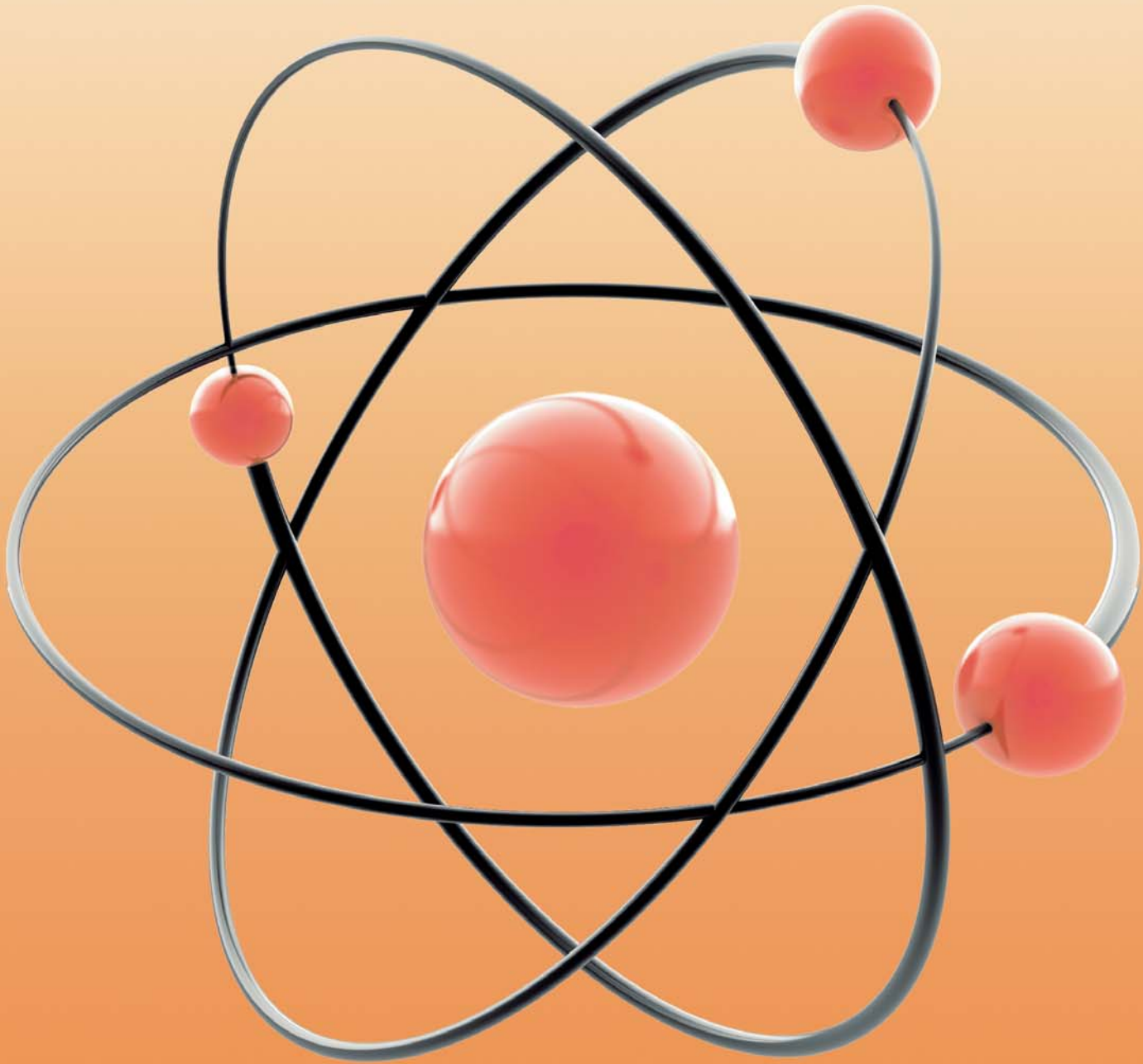



# CHEMICAL INNOVATION

The UK chemical business in global orbit



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# Green tiger burning bright

The UK chemical business is a rip-roaring, energy efficient success but it needs help and understanding to stay that way, says Steve Elliott, chief executive of the Chemical Industries Association.



Courtesy of Shell Chemicals

The UK chemicals sector had a good year in 2007 and 2008 is not looking nearly as gloomy as the economic commentators have been predicting for the economy as a whole.

During the past 12 months the sector received a huge amount of attention from the venture capital business and has been generally perceived as a hot investment. Those companies are doing pretty well in their new identities.

There has been significant investment at the heavy end of the business from the Saudi Arabians. SABIC UK Petrochemicals has recently completed its first year of operation under its new ownership of the Saudi Basic Industries Corporation (SABIC for short), following its \$685 million acquisition from Huntsman.

As a result of that deal SABIC UK Petrochemicals has become, at a stroke, part of one of the largest chemical companies in the world.

Jim Ratcliffe, chairman and chief executive officer of Ineos was named the UK's top entrepreneur by the magazine Management Today. He has been credited with transforming Ineos into the third largest chemical company in the world with 15,500 employees in 14 countries through a deal buying BP Group's Innoven chemical business for £5 billion in 2005.

▲ UK chemical plants have become highly energy efficient, partly to combat overseas challenges.

Akzo Nobel's £8.1 billion agreed takeover of ICI marks the latest and most conspicuous in a long line of foreign bidders snapping up British chemical companies.

Over the years this key element of the UK economy came up with world beating products from Perspex to Dulux paints, paludrine – the anti-malaria drug – and beta blockers. It invented the name “plastic” and developed business computing.

Although ICI had made over 50 disposals during the past decade and divested all of its core heavy chemical and pharmaceutical businesses, there were people close to the industry who were predicting that the loss of its name would have a similar impact to the demise of Rover on the car business.

In reality there has been none of that, the industry tends to get on and do things and not cause too much of a fuss.

The worrying aspect of this seamless takeover is that one has to wonder if

anybody who influences our prosperity actually cares enough.

It means there is a job to be done to boost the reputation, profile and visibility of the UK chemical industry.

Our people need to be proud of what they do and articulate it in a way that is more in touch with the national mood and consciousness. Scientists can seem intimidating with their explanations of their activities.

One of the consequences of significant amounts of foreign ownership is a lack of visible leadership.

The Chemical Industries Association has 160 companies as members and three quarters at least are now in foreign hands. That division leaves the senior most person as a country manager in many organisations.

It is often difficult then for them to project themselves as a spokesperson for the entire sector.

But the sector has a record trade surplus of £4 to £5 billion. The reasons are partly historical; it has been around for the last decade or more and includes the manufacturing related elements that end up in the pharmaceutical business and is not just commodity chemicals.

However the surplus covers the whole range of products that underpin every aspect of the economy from agricultural chemicals through to plastics and building and construction and paints and inks.

The chemical industry is energy intensive – it has to be to convert molecules into useful substances.

We use gas and oil as raw material for our products as well as energy.

At £3bn, energy is of one our biggest costs and for our most intensive companies it represents more than 30 per cent of their total costs.

Under our voluntary energy efficiency agreement with Government and the Climate Change Agreement

(CCA) that superseded it, we have improved our energy efficiency by 34 per cent since 1990. There is little potential for further improvement within existing asset life cycles.

Our products provide solutions to climate change; from materials for wind turbine blades, silicon for photovoltaic cells, fuel cells, insulation materials for housing, low weight materials for cars, synthetic rubber for low rolling resistance tyres and low temperature detergents.

Ironically if the domestic sector is to make the same scale of savings as our industry already has in terms of household efficiency, it is the chemical industry that can help with the things it makes.

The argument about energy use for 2012 and beyond is how do we best enhance and protect the competitiveness of indigenous, energy intensive European companies from Indian and Chinese competitors who are not in the carbon-trading scheme?

I would argue that some sectors need insulation from this competition because otherwise, ultimately, their parent companies will move away from the British Isles.

They are unlikely to abandon the UK quickly, given the extensive investments in this country but suppliers need to be relatively close to their customers.

That means that it is crucially important that the pharmaceutical industry remains in the UK. If it were to leave then inevitably the chemical industry would follow.

We are concerned that the EU and UK aim to increase the level of allocation of CO2 allowances by auction currently manufacturing sectors receive free allocations to minimise competitive impacts.

It is vital that vulnerable EU energy intensive manufacturing sectors continue to receive free allowances to ensure the system does not incentivise the displacement of activity to countries that are not CO2 constrained.

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## MEDIA PLANET

CHEMICALS  
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# Avoiding catastrophes

## Process Safety Management, Culture and Corporate Oversight

Thankfully catastrophic losses from fire, explosion and toxic chemical release do not happen frequently, but when they do they become fixed in people's consciousness (Bhopal, Chernobyl, Buncefield, etc.). These catastrophes have often had profound effects, resulting from loss of life, damage to the environment and major economic impact. Some people have taken years to recover from these incidents and for the companies involved there has been lost performance, share price decline and sometimes closure. All have a common theme, the failure of process safety management, culture and corporate oversight to adequately protect against identified (known) process hazards.

Traditionally the process industries have relied heavily on occupational safety measures to demonstrate their commitment and achievements in all safety related matters. (Occupational safety is related to accidents to individual people resulting from slips, trips, falls, moving equipment, etc.). Good occupational safety performance however does not necessarily indicate good process safety practices or the process safety culture of an organisation.

Process safety is all about preventing the big events, fire, explosion and toxic chemical release and involves both engineering activities and management systems. It is distinct from

workplace or occupational safety and is often beyond what can realistically be expected from a non-technical person without special knowledge and training.

Industrial process safety is a specialised subject utilising engineering skill and safety knowledge based upon accepted norms and standards, developed over many years. It provides physical or engineering solutions to perceived process hazards.

The management of process safety systems can be seen as the underlying network of systems and procedures; the human interface, which controls process safety. How well an organisation implements and completes these procedures and practices defines its safety culture and it is here that failures are most often found. This was tragically demonstrated in the loss of the space shuttle Columbia during re-entry due to damage inflicted by foam insulation impact during take-off. The subsequent investigation suggested that NASA had become complacent as a result of a succession of successful missions. This reinforced a false corporate perception that foam shedding was unavoidable, unlikely to jeopardise safety and an acceptable risk. To some extent this was as much a management failing as a technical one.

**"...safety culture is how the organisation behaves when no one is watching."**

*Centre for Chemical Process Safety (CCPS)*

More recently the chemical industry has come under the spotlight following an explosion and fire at BP's Texas City refinery. This resulted in 15 fatalities, hundreds of injuries and shut the refinery for over a year (BP's share price subsequently fell by over 10%). From a technical standpoint the cause of the incident was the loss of containment of a volatile and flammable material resulting from the failure of two separate level alarms. The underlying causes were more far reaching however and the circumstances cast a shadow over the management of process safety within BP, who until then were widely believed to have a comprehensive grasp of safety issues.

In the aftermath of the BP Texas City fire and explosion an independent review panel, chaired by former Secretary of State James Baker, concluded that "BP had not provided effective process safety leadership..." and recommended that:

- Process safety culture must be positive, trusting and open
- Process safety must come from the top, starting with the Board of Directors

- Process safety must be demonstrated by line management
- Process safety must be supported with clear expectations and accountability at all levels
- Process safety management systems must be robust and measurable
- Process safety knowledge must be disseminated at all levels
- Process safety performance should be measured via both leading and lagging indicators
- Process safety audits should be conducted

In addition to these points the 'Baker' Panel also concluded that "the Panel is under no illusion that the deficiencies in process safety culture, management and corporate oversight identified in the Panel's report are not limited to BP". These findings have been subsequently ratified by the HSE and other safety enforcement bodies.

Process safety is not confined purely to the chemical industry although this is clearly one industry sector where its application is common and often complex. Any industry sector that processes, stores or transports hazardous materials (solids, powders, gases and/or vapours) must have sound process safety measures.

**"The passage of time without a process safety accident is not necessarily an indication that all is well and may contribute to a dangerous and growing sense of complacency".**

*The Baker Panel Report*

Chilworth Technology, as one of the world's leading process safety

specialists, can objectively and independently assess process safety culture, process safety management and corporate oversight within an organisation. We can provide the necessary experience, knowledge and expertise to assist with the implementation of process safety management improvements. The net result is a comprehensive service helping companies to avoid catastrophes now and in the future.

For further information on process safety management, culture and corporate oversight please visit our website on [www.chilworth.co.uk](http://www.chilworth.co.uk) or contact us directly on +44 (0)23 8076 0722.

## LANDMARK CATASTROPHES

### 1976 SEVESO

Release of a toxic dioxin to the atmosphere

### 1984 BHOPAL

Release of toxic gas to atmosphere

### 1986 SANDOZ

Insecticides pollute the Rhine

### 1986 CHERNOBYL

Nuclear reactor meltdown after fire and explosion

### 1988 PIPER ALPHA

Fire and explosion

### 2001 TOULOUSE

Explosion

### 2003 COLUMBIA

Space shuttle explodes on re-entry to the atmosphere

### 2005 TEXAS CITY

Fire and explosion

### 2005 BUNCEFIELD

Vapour cloud explosion and fire

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### Testing



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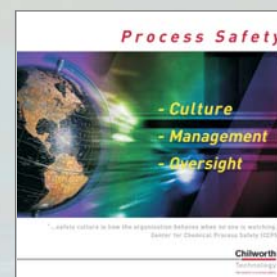
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- Instrumented Systems Safety (IEC 61508/11, SIL Determination)
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- Process Safety Training

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# Chemical romance helps clean the skies

Levels of greenhouse gasses from the UK have started to creep up again but independent research by the regulators shows the chemical industry is not to blame and is cleaning up its act faster than other industrial sectors.

BY TOM ROWLAND

"Your environment is the air you breathe, the water you drink and the ground you walk on", urges the Environment Agency in its new report on industrial environmental performance during 2006, "Putting the breaks on Climate Change."

"It pays businesses to be green. That way they save money on energy bills and reduce risk", exhorts the Environment Agency in the report.

Since 2000 the industrial sites directly regulated by the Environment Agency have managed, overall, to reduce emissions of most air pollutants, including lead which is down 41 per cent, and sulphur dioxide, down 50 per cent.

Despite the fact that the amount of greenhouse gasses being released has decreased since 1990, levels have slowly begun to rise again.

Businesses are still wasting far too much energy says the agency; in fact, 40 per cent more waste was recorded in 2006 than in 2000, according to its figures.

Against this backdrop the total amount of harmful gasses released by the chemical sector decreased by nine per cent in 2006, according to Environment Agency research, during a period when output for the sector increased.

Approximately four per cent of all the greenhouse gasses released in the UK during 2006 were a result of the chemical industry, according to the agency research.

The Environment Agency implemented a Chemicals Sector Plan in 2005 and set out a number of objectives for the chemical industry. It is pleased with the results. The fact that



▲ Cutting chemical emissions. This plant produces ethylene oxide/glycols, higher olefins, solvents and 1,3-propanediol (PDO).

the total amount of gasses released in 2006 was reduced shows that these objectives are achievable, it says.

Releases to water by the sector were down as well, says the report.

Around 20 per cent of chromium and mercury discharges come from the 3,767 chemical enterprises regulated by the agency. These discharges "decreased substantially" in 2006, says the Environment Agency.

It gave 48 per cent of sites a good "A" rating for their environmental performance, up from 42 per cent in 2005.

There were 12 pollution incidents, the same number as in the three pre-

vious years, although the chemical sector only accounted for three per cent of all industrial pollution incidents, says the agency.

But in 2006 the sector seriously breached its permit conditions 14 times, up from six in 2005.

Businesses in the chemical industry produce everything from raw materials that are then used by other industries to products such as plastic, household detergents, paints and cosmetics. It is a diverse range of products and as a result, a large amount of greenhouse gasses are released into the air every year.

The findings showed that the chemical industry has improved its impact on the environment and these improvements are more significant than in many other industrial sectors, says the Chemical Industries Association (CIA).

The CIA would however like to see those companies who complied with the laws and have significantly reduced waste and greenhouse gasses to be subject to 'less regulatory attention', says its chief executive Steve Elliot.

This would allow the much-needed resources to be directed at those who do not follow regulations, he argues.

Even when it is safe, too much is still thrown away in the UK.

England produces approximately 272 million tonnes of waste a year, of which 91 per cent is non-household waste.

Coupled with the fact that the space available in landfill sites has reduced by 10 per cent, it is clear that we are running out of both space and time.

Landfill taxes are set to increase and more resources are being developed to make recycling both a more economical and viable alternative.

The courts have begun to take environmental damage a lot more seriously and have issued much tougher penalties and higher fines. The Environment Agency states that this year, a total of £3.5 million was charged in fines; significantly higher than the £2.7 million total in 2005.

With recent developments in recycling efforts, industries are finding it easier to comply with recycling law and as such, there have been far fewer violations as well as a noticeable decrease in serious pollutant accidents.

▼ Releases into the air from the chemical industry are decreasing. Source: Environment Agency, Office of National Statistics.

Increased public awareness of environmental concerns has introduced new pressures to businesses, says the Environment Agency.

Many consumers will only use products that have been produced by environmentally conscious manufacturers.

## CHEMICAL BROTHERS REACH HIGHER

New European legislation came into force during 2007 under the acronym REACH (Registration, Evaluation and Authorisation of Chemicals).

This legislation aims to reduce the impact of dangerous chemicals released into the atmosphere every year. It applies to any single business that uses chemicals and states that any chemical used has to be registered with the European Chemicals Agency in Helsinki.

Chemical companies also have a responsibility to let consumers know what damage to the environment is caused by using their products.

## STATISTICS AT A GLANCE

3,767: Number of enterprises regulated by the Environment Agency.

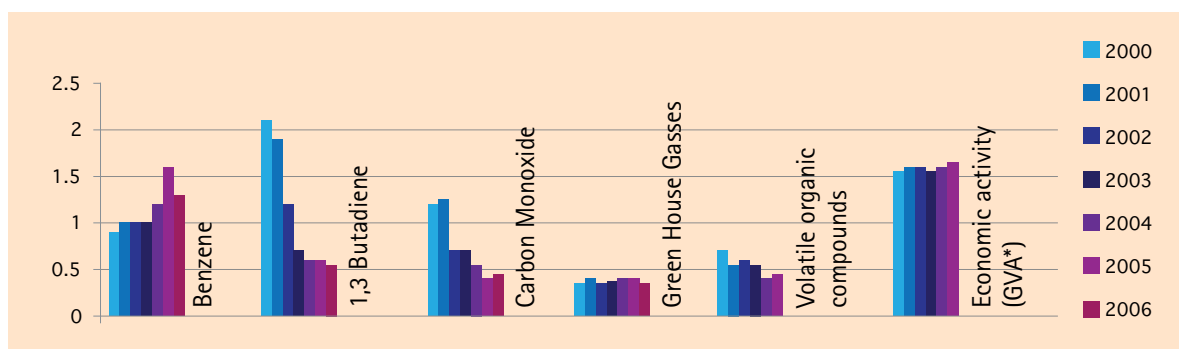
£16,582 million: Value of their economic activity in the UK.

6.7 million: Tons of oil equivalent energy use.

83: UK electricity consumption measured in petajoules, where one petajoule is the energy equivalent of a thousand trillion joules, or roughly 30 million kilowatt-hours.

475: Pollution Prevention and Control permits.

98: Integrated Pollution Control authorisations: (Issued under the 1990 Environmental Protection Act).



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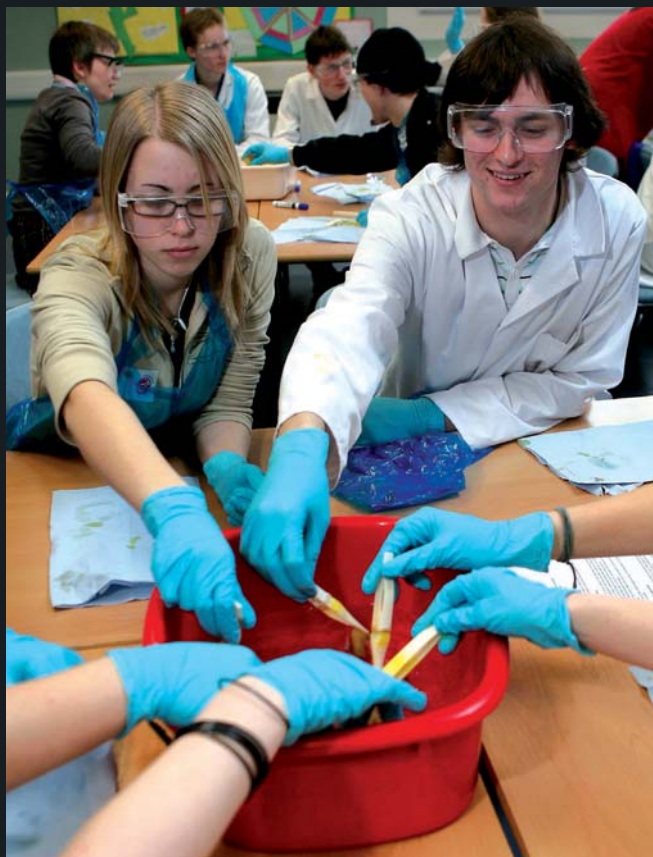
# The Innovative Spirit

## There's always something new out of Africa

Correct perhaps, but many obstacles prevent African innovators from fully exploiting their discoveries.

The Royal Society of Chemistry is creating, with Syngenta, the Pan Africa Chemistry Network to connect African chemists more effectively, and to enable them to share knowledge in scientific research and education.

The first hub of this network will be established in Kenya, focusing on agricultural development including food security and sustainability, clean water and disease prevention.



## Educating the next generation of innovators

Leading companies have become educational outreach partners of the RSC to promote learning.

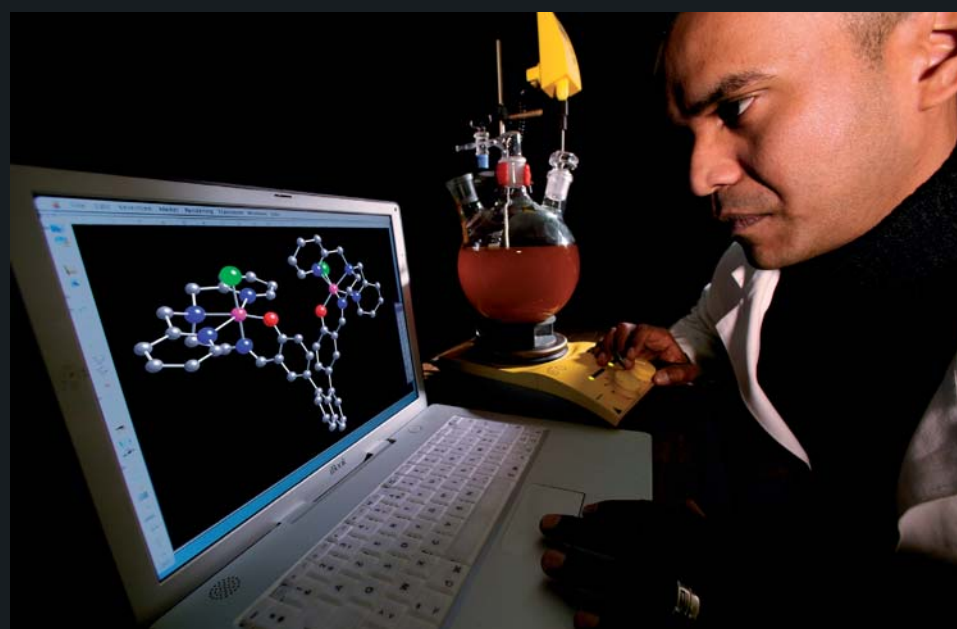
Reckitt Benckiser and Shire plc are helping teachers to deliver inspiring lessons in organic and physical chemistry to A-level students, and INEOS will help us to bring the International Chemistry Olympiad to the brightest students, whatever their backgrounds.

Pfizer are helping us to ensure a sustainable science base in the UK with activities to enhance the image of science and enrich lessons for school pupils. They will also foster self-driven learning and address skills gaps amongst undergraduate science students in areas like mathematics.

## And fostering innovation in today's business world

In the UK, the RSC hosts the Chemistry Innovation Knowledge Transfer Network. This provides a single point of access to a huge range of expert people from industry, government and academia and ensures that the government understands the priorities of chemistry using industries.

Further afield, Shell will be helping us to champion excellence in the chemical sciences by supporting scientific conferences and events which will tackle some of the key energy challenges faced by companies in environmentally and socially responsible ways.



The RSC is proud to work in partnership with:

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# Safety police stifle spirit of adventure

Chemistry can be fun but children need to take risks, "Just like we used to," say top boffins.

BY TOM ROWLAND

Professor Sir Alec Jeffreys, the man who invented DNA fingerprinting was recently the castaway on Radio4's Desert Island Discs where he recalled spending a happy childhood blowing stuff up.

"If you want to turn somebody on to Chemistry then show them how to make bangs. Bangs and stinks," he advised.

Unfortunately contemporary safety culture and the mania to ultra-caution seems to have sucked a lot of the fun out of the chemistry sets which inspired so many young scientists in the past and it might be responsible for putting a damper on children's enthusiasm for science, says Sir Martin Evans, the Nobel prize winner, director of the School of Biosciences and Professor of Mammalian Genetics at Cardiff University.

Chemistry sets are just not as exciting as they used to be, he says.

"I had a wonderful chemistry set which I supplemented with things you just cannot get these days many of my senior colleagues will admit to having had a chemistry set in their youth where they may have singed themselves or at least done some fairly dangerous experiments. Nowadays they would not even scare the cat," he said.

Radio4's Today Programme invited Graham Hutchings, professor of physical chemistry at Cardiff University to test some of the chemistry sets available in the high street.

"The idea is to look at these three and see if they are as exciting as the ones I was able to use when I was a child," he explained.

"As a boy I had approximately 400 chemicals in my chemistry set and they are just no longer available," he said.

First up was the traditional if a little



▲ Sir Martin Evans

austere looking University of Cambridge Chemistry Set.

This one got the seal of approval from Professor Hutchings.

"There are a lot of very good experiments in here which I think will interest the age group from ten up and I would really have loved to have had it at that age. They have the underlying science that goes with the experiments and I think that is important", he said

Next he looked at "Kitchen Discoveries" by Living and Learning, aimed at five to nine year olds.

"They are making ice cream, doing things where you can make things freeze," he said with some approval.

Horrible Science's "Explosive Experiments" did not quite live up to the promise of its packaging.

"I was a bit disappointed. It has warning signs all over it but compared to the fireworks I made when I was doing my chemistry set it is not what you would pay money to go and see," said Professor Hutchings.

When it came to the acid test of how big a stink or bang the modern chemistry set could deliver, Horrible Science's "Explosive Experiments" left a lot to the imagination, he concluded.

One of his personal favourites, not included in any of the modern sets is lighting Fulminating Powder, a mixture of a carbonate, a nitrate and sulphur. A variant on gunpowder, he got the recipe from a book called "The Young Chemist," published in 1933.

"Today you can't get hold of the chemicals at all, where as this was an experiment I used to do regularly at home."

"It shows us that you can oxidise material so that the nitrate acts as an oxidising agent and gives its oxygen up to the sulphur, making sulphur dioxide. You can understand the science background of this," he explains.

If only children could do things like this more.

"This is the sort of thing you need to get people enthused about science," says Sir Martin Evans.

"A chemistry set is a very good example of where everything is going wrong for our young people these days," he argues.

"They are not allowed to do this and I fear they do not even see it in schools", he adds.

"We are missing the intellectual excitement and so much of science tends to be that you need to know lists of facts, all terribly boring.

"But we are talking about our understanding of the world in which we find our selves," he says.



▲ Bangs allowed: "Catalyst" in Widnes, Cheshire, is Britain's only science centre and museum devoted to chemistry and how the products of chemistry are used in everyday life. It comprises four interactive galleries with over 100 different exhibits to tug, tease and test. Here a young visitor gets to perform a flame test, a qualitative test used in chemistry to help determine the identity of a metal or metalloid ion found in an ionic compound. If the compound is placed in the flame of a gas burner, a characteristic colour should be given off that is visible to the naked eye. Telephone: 0151 420 1121. Open daily.



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# North East England leading innovation in the process industries

North East England has a rich history in the chemicals industry and is now fast becoming a global location of choice for investors in the booming process industries.

Growing year on year, the sector is represented by the North East Process Industry Cluster (NEPIC), which boasts 1500 companies contributing an estimated £8bn to the regional economy, directly supporting 40,000 jobs with another 280,000 supported indirectly.

The North East continues to attract significant investment, producing 58 per cent of the UK's petrochemical output and almost a third of its pharmaceutical production, and is home to some of the world's leading companies.

A Science and Innovation Campus for the UK Process Industries has been established in the region. The Centre for Process Innovation (CPI) based in the Wilton Centre provides leading technology development and commercialisation expertise, open access facilities and innovation networks.

CPI is supporting new technology businesses in areas including bioprocessing, carbon-capture, nanoparticulates and flexible electronics.

The Wilton Technical Centre itself is already a beacon of industrial excellence as one of the largest R&D process industries facilities in Europe. On a steep growth curve, new industry tenants and university researchers are being added to the critical mass of international players already on site.

Multinational companies such as Saudi Arabian owned SABIC as well as small and medium sized companies, such as Cambridge Biopolymers and former London-based Banner Chemicals, have all relocated to the North East over the past 12 months.

The UK chemicals industry has always been innovative, but the growth in the North East has been exponential and is firmly focused on a strong and dominant future - taking the lead in the green revolution.

Plans to build the first large-scale, fully-integrated biorefinery in the region, producing a wide range of products from renewable fuel to biopharmaceuticals, are being led by NEPIC and its partners.

"We are aiming high, with a vision to create a beacon project, leading the way in innovation in the process industries," said Dr Stan Higgins, NEPIC Chief Executive.

"In two years' time, the Tees Valley could be producing some 800 million litres of biodiesel and 800 million litres of bioethanol a year. Already since mid-September, four companies have announced plans to invest a total of £400m in building bioethanol plants.

"Major recent investments in this area have come from companies such as D1 Oils, Ensus and Biofuels Corporation.-

"Our industrial biotechnology capability is broad and includes companies such as Avecia Biotechnology, Oxford Chemicals, Cleveland Biotechnology, Immunodiagnostic Systems and Helena - taking our biotechnology capabilities into pharmaceutical and speciality chemical areas such as flavours and fragrances and other consumer products," Dr Higgins added.

Confirming the North East as a major player on the international stage in new processes, the North East boasts the UK National Industrial Biotechnology Facility (NIBF) dedicated to bringing new products to market via environmentally sustainable production routes.

The state of the art £12m facility based at the Centre for Process Innovation (CPI) at Wilton is transforming the way vital catalysts used to make millions of everyday products are manufactured.

"Biotechnology is an emerging field that will use the products of nature to produce environmentally friendly manufacturing methods," said Dr Chris Dowle, Director of Advanced Processing at CPI.

"It heralds a new dawn for the future growth and prosperity of the process industries - the North East's and the UK's leading wealth creator.

"NIBF will help firms replace outmoded traditional chemical processing techniques with cleaner, greener, less wasteful methods - ensuring that the region is at the forefront of the green revolution."

Margaret Fay, One NorthEast Chairman, said: "Bioprocessing and bioenergy are central to our vision for the future of process technologies, energy and our overall progress to becoming one of the first carbon-neutral regions, growing our economy while reducing



our carbon and environmental impacts."

New materials are a growing market for the process sector and through working with leading players including DuPont Teijin Films, QuinetiQ and Thorn Lighting, major infrastructure and new national programmes are being put in place through the national nano particulates centre, NanoCentral, and the Plastic Electronics Technology Centre based at NETPark.

Challenges to the growth of the industry are also being tackled head-on. The establishment of the National Skills Academy for the Process Industries (NSAPI), which will be based at Teesside University, will address the skills shortage in the sector - raising the skill-level of current employees and providing the skilled workforce for the future. Many opportunities exist for highly-skilled, motivated and ambitious people to join this growing industry.

Investment into productivity improvement by NEPIC, the North East Productivity Alliance (NEPA) and the Process Industry Centre for Manufacturing Excellence (PICME), is bringing bottom-line benefits to companies based in the region, some of which can boast to be the most productive in their sector.

Major achievements through adopting lean manufacturing techniques have already been made by companies such as MDS, GSK, Sanofi-Aventis & Johnson Matthey.

It is the economic strength and passion of the region that is attracting investment from some of the world's most innovative process companies, including pharmaceutical manufacturers, consumer products, energy and biotechnology.

The Tees Valley was Sonhoe's place of choice over anywhere in mainland Europe for its planned £2bn investment into a new crude oil refinery - further evidence of the transformation

of the North East's competitiveness over the past ten years.

These are exciting times for the North East process industries and it is upon this foundation that the North East is set to spearhead the new green revolution, leading the way in the field of renewable energy and achieving its vision for carbon-neutrality.

Plans to make the North East an international hub for the biofuels industry are rapidly moving forward with delivery of the regional biofuels strategy, launched last year by One NorthEast.

Japanese company Yanmar Co Ltd has recently launched testing of the UK's first demonstration project of a new generation of 100 per cent biodiesel fuelled combined heat and power engines (CHP) at the New and Renewable Energy Centre in Blyth. Tests will evaluate the ability of its engine to run on various types of biofuels and the engine will then be developed to a point at which it will be ready to go on commercial sale.

North East England is the first region to have launched a regional consortium looking at the feasibility of establishing the UK's first Bio-pyrolysis site, which will look at a new use of biomass - biological material to be as fuel. The consortium, which includes North East Biofuels, NEPIC, CPI, NaREC and One NorthEast, is using this innovative approach to develop new markets.

Recognised as a first rate science and innovation base and well connected internationally, the North East is home to some of the leading academic and research and development facilities in the UK, including the Centre for Process Innovation (CPI), New and Renewable Energy Centre (NaREC) and Centre of Excellence for Life Sciences (CELS), as well as the renowned academic strengths of the five North East universities.

The region's freight links have also been a key selling point for new investment. It is home to the UK's second largest deepwater port, Teesport, which in terms of chemicals handling, it is the UK's largest. Teesport operators PD Ports have played a crucial role in the region attracting investments from Sonhoe, Ensus and Asda by offering logistic solutions.

Teesport is already prepared for handling low carbon fuels as well as biomass importation on a global scale and exportation of resultant products.

Regional Development Agency One NorthEast is also working together with the two regional airports to attract new air routes to the region to bring greater connectivity, the success of the new Emirates route from Newcastle International Airport direct to Dubai, playing a key role in opening up new business opportunities.

One NorthEast has also been working with partners for some time to ensure support is available regarding the new European REACH legislation affecting all companies using or making chemicals. Impacting on North East companies outside the sector, the partners have ensured the cluster can support them.

Ian Williams, One NorthEast Director of Business and Industry, said: "The importance of the process industries to the North East and UK economy cannot be underestimated. We offer an extensive package of tailor-made support and we will continue to raise awareness of the availability of new markets, build our innovation platforms, attract investment and show the world what the North East has to offer."

Future plans for the sector see strong aspirations and ambitious targets being set.

Plans to increase the process sector's GDP by £1bn by 2015, means continuing to make the sector attractive to global investors. The innovative approach to growth, such as the launch of the first biorefinery, in line with climate change towards a low-carbon, green environment, will ensure that North East England continues to be the region of choice for investors.

For further information

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▲ Smooth reaction: Chemical reactors at the Workington site of Pentagon Chemicals, manufacturing a batch of methyl magnesium chloride. The product is used in the synthesis of a flavouring for cough mixture. Each vat is four cubic metres.



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# Warm glow of approval

The chemical industry is riding high in the polls ahead of other industrial sectors.

BY TOM ROWLAND

The chemical business is more popular now than it has been at any time since the 1980s and seems dynamic and rather glamorous after a spate of high profile takeovers and a surprise surge in popularity among teenagers.

These are the key findings of an opinion poll carried out by Ipsos MORI.

“The chemical industry now ranks above oil and petrol in favourability for the first time in many years,” says MORI.

The most noticeable improvement in image has been recorded amongst 15-18 year olds, up 17 per cent.

The only group with net negative favourability towards the industry (the difference between those who are positively favourable and those who are positively hostile) are women, especially women with young children.

The most favourably disposed groups towards the industry are those with family and friends working in the industry, those living near chemical manufacturing sites, men and those over 65.

Favourability amongst socio-political activists is now the same as the general population.

In contrast the net favourability of both the pharmaceutical and oil and petrol industries are down by 13 per cent.

In the case of the former MORI says it thinks this is largely due to the perception of unethical behaviour by the industry brought about by the film “The Constant Gardner”.

The poor perception of the oil business has been brought about mainly by high energy prices.

These industry sectors are thought to be fairly well differentiated in people’s minds but it is possible that there has been some minor negative impact on the chemical industry, says the report.

MORI is at a loss to explain the boost for the chemical business among teens. The rise in popularity did however coincide with the breakthrough of the rock band “My Chemical Romance” which released a hit album during 2006 and a rising perception among the young that chemistry is the bedrock science.

Retail and food sectors continue to be the most highly regarded.

There continues to be a large variation in net favourability towards the chemical business between the regions.

Large increases in Scotland and Wales negated equally large falls in 2004, Wales is now the most favourably disposed part of the UK towards the industry (22 per cent), the North East and Scotland also scoring relatively highly (11 per cent).

Merseyside (-5 per cent) and the West Midlands (-1 per cent) are the two regions with overall net negative favourability towards the industry. Mori put the former down to recent job losses in the area.

Despite widespread publicity about Reach, less than 0.1 per cent of the population have heard about the new legislation or direct NGO activity connected with it.

However 24 per cent of people (the same as 2004) are aware of media coverage of environmental pressure groups, anti-chemicals campaigns.

Linked to this, 28 per cent of the public have stopped buying a particular product because of the perceived risk of chemicals contained in them; top of this list are household cleaners, disinfectants and air cleaners.

Trust in the industry continues its upward trend. This is related to 59 per cent of the population calling for tougher regulation of the industry (down 4 per cent from 2004).

A quarter of people believe that a consequence of tougher regulation is that companies will relocate to other countries with the loss of jobs.

The public continues to see the principal benefit of the industry as products that enhance the quality of life, and the principal risk as the environmental effects of dumping waste products.

On balance the public feels, even more strongly than in 2004, that the positives of chemicals outweigh the negatives. However fewer people (44 per cent down from 49 per cent in 2004) now believe that the industry is working harder than it used to to control pollution.

The survey was carried out, in April 2006, by face to face interviews of 2,117 people aged 15 or over, the sample was representative of the UK population as a whole in terms of age, gender, location and social class.



# New chemicals behind the eco-house

From microscopic plastic balls with heat absorbing wax centres to innovative insulation materials and polymer additives that strengthen concrete, chemistry is pioneering sustainable homes.

BY TOM ROWLAND

The idea of conserving energy in house building has been taken a step further in a corner of the University of Nottingham's campus where the world's largest chemical company, BASF, a supplier of raw materials to the construction industry, has teamed up with the University's School of the Built Environment to develop a new eco-friendly house.

The house, part of the University's Creative Homes Project, will demonstrate how innovative chemistry, technology, new building products and applications can provide house builders and home owners with affordable, eco-efficient homes which can be heated by renewable technologies, for a build cost of no more than £70,000.

The house has been designed to conserve energy and offer a way to deliver affordable sustainable living. The inspiration for the house actually came from the process of brewing beer. The house is shaped like an oast house, which is where hops were traditionally dried with the natural flow of air.

Windows on the highly insulated north, east and west walls have been kept to a minimum. The southern ele-



▲ Under construction: Insulated concrete blocks make up this framework.

vation consists of a fully glazed two-layer sunspace. Both of the glazed screens can be opened or closed to facilitate heating or cooling.

A new controlling system has been incorporated into the house to ensure maximum energy efficiency. It will en-

able the University to monitor energy levels and shut windows or turn up the heat remotely. This new controlling system is connected to the ground-air heating system and other renewable energy sources within the house.

The ground-air heating system utilises energy that is stored in the ground. It consists of a network of pipes laid in the ground below the house at a depth of 1.5 metres where there is a temperature of between 8 and 12°C. This device will save money and conserve energy.

There are solar panels on the roof and back-up will also be provided by a biomass boiler run on waste meal from rape seed. This boiler can also use wood or other biofuels - renewable energy resource with unlimited supplies that are easily transported.

To minimise the need to heat the house, the walls and roof have been constructed from BASF's insulation raw materials.

The ground floor walls were built in just three days, using insulating concrete formwork. These innovative building blocks, consisting of two layers of expanded polystyrene, were then filled with ready mix concrete to provide an airtight, insulating wall. A specially developed concrete additive from BASF helped to strengthen the cement, reduce the amount of aggregates needed, and reduce the carbon dioxide content of the cement.

The first floor walls and roof demonstrate another application of BASF's in-

sulation materials - this time polyurethane, which forms the filling in a prefabricated timber sandwiches known as a structural insulated panels.

The outer layer of the roof is another unusual feature...It is one of the first houses in the UK to have a metal

“The house will cost around £70,000 to build and left to run than any conventional home”

roof, coated using BASF's coil coatings and heat management pigments. Traditional roofing materials absorb solar energy, generating heat into the roof and the surrounding air. The reflective roof of the BASF House absorbs less solar heat and so less is generated into the local environment. Compared to using concrete roof tiles, this Corus made roof saves over eight tons of carbon dioxide.

Inside the living area another BASF innovation comes into play - special plasterboard cladding which acts like an air conditioning system. These

boards contain microscopic plastic balls with a wax centre. As the temperature rises, the wax melts and begins to absorb heat, cooling down the room. As the temperature drops, the wax becomes solid and the heat that was absorbed is released, heating up the room. This plasterboard is only 1.5cm thick, but its thermal storage capacity is the same as that of a nine-centimetre thick concrete wall.

The Oast house inspired design has meant that the house can rely as much as possible on passive solar power. There is no gas supply and electricity is used to power appliances and lights.

As more developers embrace the idea of energy efficient housing, so the demand for them will increase. This in turn will help the environment and help us all move towards a sustainable future.

The houses will certainly reduce carbon footprints and conserve the diminishing supplies of non-renewable resources that we have left. It currently lies at level 4 of the Code for Sustainable Homes that was devised by the government and runs from Level 1 to Level 6.

The house will be officially opened tomorrow. (Jan 30th). It will be occupied by staff or students from the University, and will be carefully monitored. Smart meters have been installed to measure the use of resources in the house, with the data presented on a touch screen panel in the kitchen.

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# Five gold stars

When the chief executive of Pentagon decided to invest in process safety the results were less than dramatic . . . just as he intended.

BY ALAN FLYNN

Pentagon is an independent UK manufacturer of speciality chemicals and a processor of intermediates for the pharmaceutical, agrochemical and industrial sectors.

Its specialties business at Workington has operated for six years without a lost time accident, winning a safety award in 2006.

Since acquiring its fine chemicals business at Halebank, the Pentagon safety culture has brought about a reduction in accidents at that site as well. Halebank has operated for two years without a lost time accident, a record for the site.

Early in 2007, the Baker Panel Report, chaired by former US Secretary of State James Baker, was published following the disaster at the BP Texas City refinery.

The focus of the Panel was corporate oversight of safety management systems and corporate safety culture.

It recommended that in future companies should focus on excellence in process safety performance, not legal compliance. The panel based its findings and recommendations on general principles or other standards for reducing process risks.

On reading the report, Pentagon's CEO, Allan Laing realised there was a potential opportunity for Pentagon to improve, even from a very strong baseline of low personal injury rates. There were some strong messages for all, relating to corporate safety culture.

Under his direction, process safety performance has been made a business priority, and a Group Process Safety Improvement plan was developed and launched during 2007.

The combined technologies of the two Pentagon sites offer a comprehensive array of chemistries.

Both sites manufacture a range of own products, but there is an equally strong emphasis on contract and toll manufacturing.

Pentagon serves a wide range of markets that affect our lives daily. These include agrochemical, pharmaceutical, veterinary, flavour & fragrance, textiles, paper, personal care,

▼ A batch of pharmaceutical intermediate is isolated on a filter at the Halebank site. Product is washed and dried in situ and packed directly into drums. The end use is tablets for treating high blood pressure.



starch modification, curing agents for polyurethane epoxy resins, plasticisers, specialist coatings and corrosion inhibitors. The business also produces a number of important oil and fuel additives at the Workington site.

Pentagon has a tradition of teamwork and a high visibility culture, particularly in health and safety.

## Process safety leadership

Leadership from the top of the company, starting with the Board and going down, is essential. In making certain its management and workforce understand what is expected of them regarding process safety performance. Personal injury rates cannot be relied upon as an indication of acceptable process safety performance. In the absence of more clearly focussed indicators, this can create a false sense of confidence.

## Employee empowerment.

A good process safety culture requires a positive, trusting and open environment with effective lines of communication between management and the workforce, including employee representatives.

## Improve process safety awareness.

Work with others within the industry to help increase process safety leadership awareness via the CIA Process Safety Leadership Issue Team. Review and revise process safety hazard and risk assessments.

## Improve plant integrity.

- Train all operators in process safety essentials.
- Supervise and measure compliance with process safety risk control systems.
- Carry out inter-site process safety audits.
- Measure and report leading process safety performance indicators to the CEO.

Pentagon has played an active role in the CIA Chlorine Users Network. Through the Network, the CIA, jointly with the regulators, has developed new ways to the risk of liquid chlorine leaks.

# Building a solution

Heating buildings currently accounts for 46 per cent of the UK's carbon dioxide emissions.



Preventing heat loss is key and, with the building industry under increasing pressure to use and develop solutions to reduce carbon dioxide emissions from buildings and help meet the challenge of climate change, an innovative solution was needed.

Approximately one third of all roofs in the UK are flat in terms of total area. Flat roofs are particularly favoured in hospitals, schools and other public buildings as well as shopping centres, offices and other commercial buildings.

The traditional approach to insulating a flat roof is to position the insulation directly on top of the deck and below the waterproofing layer. However, in an 'inverted' or 'up-side down' flat roof the insulation is laid on top of the waterproofing layer. Whilst this novel solution has several advantages over the traditional approach it attracts a penalty to its thermal performance. This is due to rainwater percolating through the ballast and insulation board joints to cool the deck surface below. To compensate for this means increasing the insulation thickness by at least 20 per cent.

Dow Building Solutions, a business unit of The Dow Chemical Company has developed its ROOFMATE\* MinK inverted roofing system which enables this rainwater cooling penalty to be reduced to below 2 per cent. This comprises ROOFMATE SL insulation, a grade of STYROFOAM\* blue extruded foamed polystyrene, offering good insulation, high compressive strength and water resistance, to-

gether with a specially designed 'breather' ('Gortex' style) membrane ROOFMATE MK. This means that less insulation is required to achieve the same energy efficiency targets. It also helps to minimise heat loss from flat roofs which can account for as much as 25 per cent of the total heat loss from a building. This system won the Chemical Industries Association's 2007 Innovation Award.

The secret of STYROFOAM's exceptionally high performance is its inherent closed cell structure, unique to extruded polystyrene and developed by Dow in the 1950's. Since then, millions of square metres of SYROFOAM extruded polystyrene solutions have been installed around the world on projects large and small alike.

Dow's ROOFMATE MinK system was chosen for the new £50 million redevelopment of the Vancouver Shopping Centre in King's Lynn, Norfolk.

The shopping centre's roof has an area of 11,500 sq m, enough to cover over two football pitches. The ROOFMATE SL insulation is traveling less than a mile to the site from its place of manufacture.

For the project, Roofmate SL-X was offered in conjunction with Roofmate MK, a vapour permeable membrane that compliments the extruded polystyrene by minimising its thickness to meet with current building regulations for the roof's thermal performance.

"The ROOFMATE MinK system ensures we have a highly competitive inverted roof solution to offer any architect or contractor considering a flat roof design. Dow developed this system in central Europe almost ten years ago, and subsequently received British Board of Agrément certification. Since then its extensive use on many buildings has added to its credibility as a perfect choice, offering exceptional long term performance," said Jayne Law, Dow Building Solution's UK and Ireland Sales Manager.

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## REACH

REACH represents the most fundamental change in the way chemicals are legislated within the EU. Anyone that makes or imports a chemical into the EU above 1 tonne per year will need to register it. This includes substances in articles if they are released during normal and reasonably foreseeable conditions of use. During the next 11 years 30,000 existing chemicals will have to be registered; this will present a tremendous challenge to the chemical industry.

This applies not only to manufacturers of chemicals but also to downstream users of those chemicals. All companies must ensure that the way they use chemicals has been considered under REACH.

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For further information on how JSC can help you please contact Richard Elsmore or Lucy Croucher.

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# Vibrant sector faces retirement crisis

A plan to tackle the looming skills shortage urgently needs to deliver fresh talent

BY TOM ROWLAND

The chemicals industry is one of the UK's largest with the last decade seeing a growth of more than five times as fast as other manufacturing industries.

A highly skilled workforce is essential for the chemical industry to sustain its production with everyone from scientists, engineers to every level of management needing to be fully trained in order to meet the demands of everyday life.

The sector is responsible for pharmaceuticals, man-made materials for clothing, household chemicals and industrial chemicals; all of which are used by people on a daily basis. The

average UK household is estimated to spend £30 a week on products, making it essential that they are safe and have gone through stringent testing.

Unfortunately, there has been a significant decline in the number of fully trained personnel applying for work in all areas of the chemical industry. This has meant that the current workforce is largely one of people nearing retirement and as such, there will be an increasing demand for new recruits over the next decade.

Cogent, the chemical industry's sector skills council, has carried out research into what is missing from the

sector with regards to skills and training. Their findings show that there is no structure for assessing skills and as a result many people, at all levels of employment, do not have the skills which are so desperately required.

Dr Brian Murphy, research director at Cogent, underlines the depth of the recruitment crisis facing the sector.

"New science and technological know-how will not be sustainable without workforce development to ensure the supply of a highly skilled workforce," he said.

He also talks about certain areas of the industry being handed over to companies abroad because of the skills shortage: "Today knowledge can travel the globe in seconds but skills are comparatively less mobile, leaving developed economies such as that of the UK vulnerable to off-shoring".

Many of the production operatives are not able to cope with the advances in modern technology, while many managers are not trained in areas such as change and business management.

The industry is in great need of graduates to replace those who will be retiring over the next few years and are particularly looking for graduates of chemical and energy engineering.

However, in order to appeal to new graduates, it is very important that young people are interested in learning about science while at school.

The research showed that there must be more importance placed on encouraging school children to study science. This will in turn lead to more young people studying science and engineering at college and university.

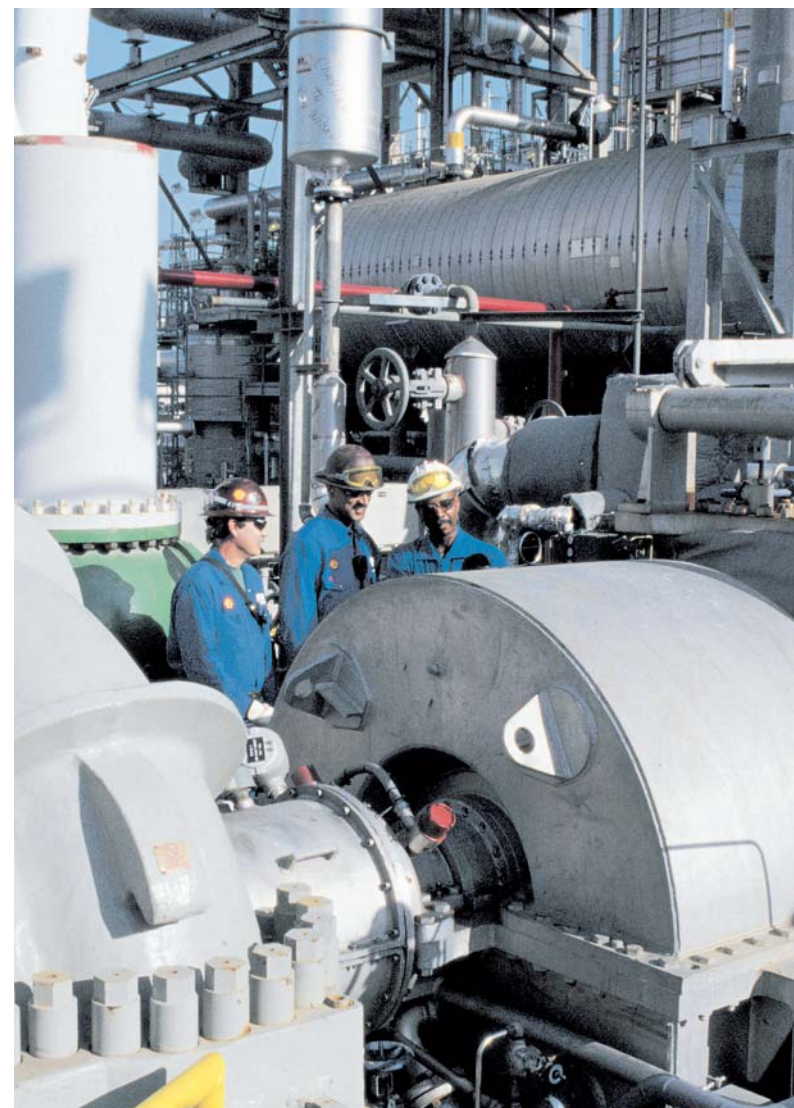
Employers claim to need help with presenting the industry as a good career option because it has received much negative press over recent years. They want to change people's perception when it comes to the sector and allow future employees to fully understand what the industry wishes to achieve.

After the results from the research had been gathered and studied, Cogent developed five action points which addressed the concerns. It is hoped that by working with employers in the industry, the gaps in the skill requirements will be covered through comprehensive training.

The five action points are as follows:

## Cogent Competence Framework

This will ensure that there are im-



▲ It is a people problem: the supply of good quality new recruits is at a trickle

proved standards for the chemical industry so that employees meet the required skill level.

## Cogent Career Pathways

Cogent will work with employers to draft specific job roles and training schedules for all staff currently em-

“Minister announces new skills academy is being developed for the sector”

ployed. There will be career guidance for potential employees as well as advice for students hoping to one day work in the industry. This will ensure that there is a clearly defined career development plan which is very attractive to graduates.

## Cogent Upskilling Programme

There is currently an industry-approved technician programme being developed which will allow successful candidates to gain an accredited qualification.

Cogent Apprenticeship Programme is also being developed which will ensure that new employees have been fully trained.

## Cogent Industry Passports

Are being extended for all industries which fall within the Cogent sector and will include standards which need to be met for all those who work on site.

These action points are designed to improve the skill levels of people currently employed in the chemical industry as well as offering more incentives to young graduates considering a career within this sector.

Alongside these points, David Lammy, Minister for Skills, announced in November last year that a National Skills Academy (NSA) was being developed for the chemical, pharmaceutical and polymer areas of the sector.

The academy is to be a subsidiary of Cogent and will educate, train and develop the skills of the workforce according to set standards. It will ensure there is a highly skilled team of staff who are competent enough to take over the roles of those who will be retiring in the near future.

This new generation of scientists, engineers and managers are the ones who can build upon an industry where so much has been achieved already.

The first courses are due to start in the early part of this year and have a number of companies sup-

Continued on page 13 >

## BOOSTING SKILLS WITH THE GOLD STANDARD



One of Cogent's key activities is supporting chemicals employers to upskill their workforce to world-class standards and in turn to improve productivity.

Cogent research shows that for the for the UK chemicals industry, around £370m would be added to the sector's GVA by matching the EU's productivity levels, as a consequence of improving skills.

In the Cogent science-based and chemistry-using industries, technology continues to advance in sophistication and new product development is crucial for the sector's continued success. As a result, the workforce continually needs to become better skilled innovative and entrepreneurial. Indeed demographic research has demonstrated that 70% of the 2020 workforce is already in employment highlighting the imperative for a robust industry upskill programme.

To provide the all-important underpinning framework for such a programme Cogent has initiated the development of the "Gold Standard". The Gold Standard is an aspirational standard and framework that underpins the upskilling programme. For the key job roles in the chemicals industry, employers, with support of Cogent, have defined the skills and competencies required to perform the particular role to world-class standards around four key skills areas:

- Technical & Competence
- Business Improvement (including quality)
- Functional Skills
- Health, Safety and Environment

Cogent will be delivering The Gold Standard Framework through the National Skills Academy Process Industries and its network of accredited training providers. This means the training provision will have been shaped by employers and designed to agreed, quality assured standards which meet current needs.



www.cogent-ssc.com



# Jennifer Clark - chemistry graduate, company executive and a woman in a hurry

Doing the unexpected and fighting against received orthodoxy can lead to a career with accelerated promotion and glittery prospects.

BY TOM ROWLAND

"I always had a rebellious streak at school and when advised not to do something it always seemed more of a challenge to go for it," says Jennifer Clark.

When they told her chemistry was for geeks and geeky boys at that she fought back. Studying chemistry was not something that came naturally but she says she always enjoyed experimentation and problem solving.

Jennifer (28) originally came from London but she secured a place studying Environmental Chemistry at the University of Wales, Bangor having first completed 'A' levels in Chemistry, Biology and Art.

As with many people it was an inspiring teacher who turned her on to the idea of doing a degree in Chemistry.

Her teacher had worked in industry and had an idea of how theory translated into practice, she explains.

"Unfortunately so many others have never been on to an industrial plant. Some form of work experience for those teaching chemistry to show them what happens on the more commercial side would be really beneficial," she argues.

She liked the freedom attached to the degree course, the fact that it allowed her to be out in the field sampling and monitoring; essentially applying the skills of a chemist to protect the environment.

She decided to stay in Wales and ended up getting a job working for Eastman Chemicals in Anglesey, starting in the laboratory as an analytical chemist.

Within two years she was fast tracked and promoted to be the plant Health and Safety and Environmental specialist.

"I believe passionately that chemistry can be the solution to many

**“There is a wide range of careers available to any graduate considering entering the chemical industry today”**

global problems, from designing renewable energy sources to providing techniques to deliver and purify drinking water systems for developing countries, to finding cures for life-threatening diseases," she said.

As an HSE specialist she is involved in a range of activities on the manufacturing site from training, inspections, environmental monitoring and community events and is also an active member of the fire fighting team.

Last summer Jennifer won the Chemical Industries Association Young Ambassador Award.

as the 'Gold Standard' which marks out the skills and qualifications required by the industry. Job roles will be clearly defined and a high level of service will always be maintained.

The four main areas where the gold standard will be of particular importance are:

- Technical and Competence
- Business Improvement
- Functional Skills
- Health, Safety and Environment

The act of improving skills within the chemical sector is one of Cogent's main activities. This is to ensure that the staff are kept up to date with the ever-increasing technological advances and that the most up-to-date

Part of the role is to chair a group known as the "Future Forum", composed of young entrants to the chemical industry. She organises speakers, events and there are even opportunities to contribute to Government lobbying.

One such activity has been the "Children Challenging Industry" scheme, set up with the intention of engaging primary school children and their teachers in a dialogue with the chemical industry and showing the opportunities that exist.

"The aim is to give them an idea of what happens in industry," says Jennifer.

Research shows that the younger age group is much more open to the idea of being involved and working in industrial environments.

"By the time people are teenagers they have often made up their minds about the sorts of career they want".

She has worked with the network in the North West. The idea is to show teachers eye-catching and entertaining classroom activities that it is hoped will fire the imagination of their young audiences.

A second phase involves visits to industrial sites where the youngsters are able to see how the theory, experimentation and calculation carried out in the classroom translates into the real world.

"Think it is having a very positive effect. It helps reinforce other industry initiatives on issues such as environmental responsibility and the key role that the industry's products play in our lives," she says.

There is a wide range of careers open to any graduate entering the business from accountancy and manufacturing to engineering. New entrants are not condemned to spending their entire careers in a laboratory, says Jennifer.

products are used.

As Dr Murphy points out 'The chemicals and chemical processing industries [...] have been reformed and sustained throughout the 20th century. The latest challenge for the sector is to be smart, safe, clean and sustainable. Change through new directions in science, technological innovation and upskilling are the key to continued sustainability as the twenty-first century and the rush to skills takes hold.'

With help and input from Cogent, there is no doubt that the skills shortage within the chemical industry will get the boost that is needed and that it will be sustained throughout the 21st century.



▲ Jennifer Clark went into the business with 'A' levels in Chemistry, Biology and Art.

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Continued from page 12>

supporting them such as Banner Chemicals, Johnson Matthey, LINPAC and Solutia UK.

The chemical industry has a need for a very talented workforce and because of this; it must ensure that its employees, both current and new, have gone through an advanced training programme - which is what the academy will be providing.

To date, 12 per cent of employers in this sector have guaranteed to use the services available from the academy and this number is set to increase as the academy opens up in regions throughout the UK.

The standard which will be used by the National Skills Academy is known



# Making savings down the line

Squeezed by international competition on one side and rising transport costs on the other, chemical companies are desperate to find ways of making savings in their supply chains.

BY TOM ROWLAND

"The intensification of competition in the global chemical market will force European producers to find new ways of improving efficiency and service quality. As the scope for further efficiency gains in the production process will be limited, the supply chain is likely to become the main source of future cost savings." So begins the introduction to a report jointly produced by the European Chemical Industries Council (CEPIC) and the European Payments Consulting Association (EPCA).

"These savings will nevertheless be difficult to secure because at the same time supply chain costs will be subject to inflationary pressure. Transport infrastructure is becoming increasingly congested, fuel and labour costs are rising, downstream supply lines are lengthening, customers are demanding shorter lead times and environmental and safety controls on the distribution of chemicals are steadily tightening," the report continues.

It is a recipe likely to see companies starting to panic, which means there is a fertile furrow to be ploughed by the consultancy industry.

"Chemical companies work hard to improve their revenues and deliver significant shareholder value. One

clear path to achieving these goals is through world-class supply chain performance. The challenge is determining what steps to take to achieve that performance, where to invest and how to measure results," says international business consultancy Accenture.

To help find answers, Accenture is conducting a series of studies on chemical industry supply chain best practices. The first study, started in 2005, has provided more than 260 chemical businesses with insights into their supply chain. The 2007 Global Chemical Industry Best Practice Study & Assessment is still underway.

The scope of the 2007 study has been expanded to include topics such as pricing and margin management; procurement; commercial strategy; planning; networks and assets; outsourcing; order fulfilment; and transportation management, says Accenture.

"The lack of transport capacity is a preoccupation within the industry this year," says Marco Fernandez, executive director, LogiChem 2008. The annual event in Europe for the chemical industry supply chain is to be held this April in Dusseldorf, Germany.

"Last year there was a crisis when suddenly transport providers were sell-

**"Rail freight is cheap, efficient and provide the solution to many of these sectors transport problem"**



ing all of their capacity so you went from a situation where for the past 20 years chemical companies had faced downward pressures on transport costs to a situation where they could not get product to market without paying high premiums," he explains.

A combination of smaller operators being forced out of the road haulage industry for chemical products and a sharp increase in demand for capacity created a bottleneck he said.

"Suddenly there was this massive reversal for chemical companies where effectively they could no longer negotiate on prices," he said.

One year on and the transport companies have all raised their prices, adding significant cost to chemical company supply chains and squeezing their margins, he argues.

The result is for companies to scour their logistics operations looking for potential cost savings now that they have to pay more for transport, he says.

David Closs and Diane Mollenkopf argue in an article in Supply Chain Management that better and more ex-

tensive use of rail transport offers a solution for the chemical industry.

"The chemical industry is struggling to improve its supply chain performance, and improved asset utilisation may help get the industry headed in the right direction. Since most chemical firms own or lease their rail fleets, rail utilisation can have a substantial impact on overall asset utilisation," they say.

They have analysed chemical industry rail car cycle data focusing on major sources of variation in transit inventory as railcars move from plant to customer and back.

Substantial differences exist between hopper and tank car performance; distance is not a major predictor of total cycle time variance; and vendor-managed inventory relationships can operate with less customer inventory, they conclude.

Further analysis is needed to investigate differences between hopper car and tank car transit times. Additional research should also involve the railroad companies as participants in chemical firms' supply chains.

The paper provides several practical

▲ Shell Chemicals is one of the first companies to introduce Elemica electronic carrier booking to improve the speed and efficiency of communications with its road transport service providers.

recommendations for chemical company supply chain managers relating to process controls, focusing on large customer accounts, managing transit time and variation of rail cars between plant and factory.

The chemical industry has been slow to adopt supply chain practices, they conclude. Railcar coordination is one means of enhancing supply chain performance, reducing both inventory and transportation assets.

Sources:

*Supply chain excellence* in the European Chemical Industry by EPCA/Cefic.

*Improving chemical industry performance* through enhanced railcar utilisation by David J. Closs, Diane A. Mollenkopf, Scott B. Keller  
Journal: Supply Chain Management.

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